Geomatics

Department of Geomatics

Geomatics is three-dimensional measurement, mapping and visualisation and is one of the fastest growing IT sectors in the world. It is ideally suited to students who have an interest in the management of the environment, information technology, computing and computer graphics, mathematics and the outdoors. A number of combined degree options are available with science, law, arts and information systems.

A major attraction of geomatics is the diverse range of career options available. The rapid growth of geomatics within the broader IT discipline has resulted in graduates obtaining an exceptionally high level of industry employment worldwide. Students routinely find employment in land development and management; natural resource and environmental management; computer-based mapping and modelling; hydrographic, land and engineering surveying; and applied computing and geographical information systems. Other exciting new areas of employment for graduates are web mapping specialists, IT systems engineers, IT consultants, business development managers and with engineering mapping and multimedia companies.

In the degree, first-year students gain an understanding of mathematics, statistics and computing as well as a sound introduction to a broad range of geomatics subjects. The first year also includes a one-week residential field course which integrates theoretical material with practical geomatics concepts.

In later years, students continue with geomatics subjects in addition to subjects in geographical information systems, remote sensing, visualisation, information science and database design, land law, management, professional development and satellite positioning.

Final years provide students with skills in advanced measurement sciences including applications and development of geographic information systems, remote sensing, spatial analysis and integrated systems in geomatics. Bachelor of Geomatic Engineering students complete subjects in residential subdivision design, photogrammetry, integrated systems, land administration and a comprehensive research project.

The geomatic engineering degree is accredited by the Surveyors Board of Victoria, Engineers Australia and the Institution of Surveyors Australia, thus allowing graduate registration as professional engineers and surveyors. The Bachelor of Geographic Information Technology does not lead to a professional accreditation.

Graduate research programs are also available in all areas taught in the undergraduate courses.

Department of Geomatics: undergraduate degree course structures

Bachelor of Geographic Information Technology

THERE WILL BE NO ENTRY INTO THIS COURSE FROM 2007

The recommended or standard course structures are listed below. When setting the timetable every effort will be made to avoid clashes between the times of classes associated with these sets of subjects. Students should be aware however, that if it proves to be impossible to achieve a timetable without clashes in these sets of subjects, the Faculty reserves the right to modify course structures in order to eliminate the conflicts. Students will be advised during the enrolment period of the semester if the recommended courses need to be varied. Where the courses include elective subjects these should be chosen so that timetable clashes are avoided. In particular, students in combined degrees should plan their courses so that the subjects chosen in the other faculty do not clash with those recommended for the engineering component.

Second year		Points
Semester 1		
451-235	Spatial Databases *(p.7)*	12.5
451-204	Professional Development *(p.6)*	12.5
451-332	Imaging in the Geosciences *(p.7)*	12.5
An approved elective		12.5
Semester 2		
615-140	Technologies for Information Systems *(p.1)*	12.5
620-160	Experimental Design & Data Analysis *(p.5)*	12.5
451-236	Spatial Visualisation *(p.7)*	12.5
121-172	Global Ecology and Biogeography *(p.2)*	12.5

Third year		Points
Semester 1		
451-331	Spatial Analysis *(p.7)*	12.5
451-418	Land Administration *(p.8)*	12.5
451-449	Professional and Business Studies *(p.9)*	12.5
An approved elective		12.5
Semester 2		
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
615-145	Concepts in Software Development I *(p.2)*	12.5
An approved elective		12.5

Honours		Points
Year-long		
451-455	Research Project *(p.9)*	62.5
Semester 1		
451-420	Spatial Data Handling (Hons) *(p.8)*	12.5
451-424	Management of GIS(Hons) *(p.8)*	12.5
451-440	Research Methods *(p.9)*	12.5

Bachelor of Geomatic Engineering (BGeomE)

The recommended or standard course structures are listed below. When setting the timetable every effort will be made to avoid clashes between the times of classes associated with these sets of subjects. Students should be aware however, that if it proves to be impossible to achieve a timetable without clashes in these sets of subjects, the Faculty reserves the right to modify course structures in order to eliminate the conflicts. Students will be advised during the enrolment period of the semester if the recommended courses need to be varied. Where the courses include elective subjects these should be chosen so that timetable clashes are avoided. In particular, students in combined degrees should plan their courses so that the subjects chosen in the other faculty do not clash with those recommended for the engineering component.

First year		Points
Semester 1		
451-103	Information Science and Programming *(p.5)*	12.5
451-100	Geomatics Science *(p.5)*	12.5
451-113	Computer Systems and Graphics *(p.5)*	12.5
620-161	Introductory Mathematics *(p.6)**	12.5
Semester 2		
451-101	Surveying 1 *(p.5)*	12.5
451-105	Introduction to GIS and Remote Sensing *(p.5)*	12.5
620-140	Intermediate Mathematics *(p.4)**	12.5
620-160	Experimental Design & Data Analysis *(p.5)*	12.5

* Students who studied Specialist Maths 3/4 in VCE, should take the sequence 620-141 Mathematics A and 620-142 Mathematics B instead of 620-161 Introductory Mathematics and 620-140 Intermediate Mathematics.

Second year		Points
Semester 1		
451-203	Land Law *(p.6)*	12.5
451-204	Professional Development *(p.6)*	12.5
451-208	Computational Methods in Geomatics *(p.6)*	12.5
451-235	Spatial Databases *(p.7)*	12.5
Semester 2		
121-172	Global Ecology and Biogeography *(p.2)*	12.5
451-200	Surveying 2 *(p.6)*	12.5
451-206	Least Squares & Network Analysis *(p.6)*	12.5
451-236	Spatial Visualisation *(p.7)*	12.5

Third year		Points
Semester 1		
421-255	Management for Engineers 1 *(p.9)*	12.5
or		
325-101	Managing People and Organisations *(p.1)*	12.5
451-331	Spatial Analysis *(p.7)*	12.5
451-332	Imaging in the Geosciences *(p.7)*	12.5
451-333	Cadastral Surveying & Land Development *(p.7)*	12.5
Semester 2		
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
451-337	Satellite Positioning and Geodesy *(p.8)*	12.5
451-447	Photogrammetry *(p.9)*	12.5

Fourth year		Points
Year- long		
451-450	Research Project *(p.9)*	25
Semester 1		
451-418	Land Administration *(p.8)*	12.5
451-449	Professional and Business Studies *(p.9)*	12.5
451-499	Integrated Spatial Systems 2 *(p.9)*	12.5
Semester 2		
451-422	Residential Land Development *(p.8)*	12.5
121-028	Sustainable Development *(p.3)*	12.5

Fourth year	Points
or	
An approved environmental elective	12.5
An approved elective	12.5

Bachelor of Arts/Bachelor of Geomatic Engineering (BA/BGeomE)

Students taking combined degree courses who intend to overlap third- and later-year subjects, should consult with a course adviser to ensure all core geomatic engineering requirements are met.

The recommended or standard course structures are listed below. When setting the timetable every effort will be made to avoid clashes between the times of classes associated with these sets of subjects. Students should be aware however, that if it proves to be impossible to achieve a timetable without clashes in these sets of subjects, the Faculty reserves the right to modify course structures in order to eliminate the conflicts. Students will be advised during the enrolment period of the semester if the recommended courses need to be varied. Where the courses include elective subjects these should be chosen so that timetable clashes are avoided. In particular, students in combined degrees should plan their courses so that the subjects chosen in the other faculty do not clash with those recommended for the engineering component.

First year		Points
Semester 1		
451-100	Geomatics Science *(p.5)*	12.5
451-113	Computer Systems and Graphics *(p.5)*	12.5
620-161	Introductory Mathematics *(p.6)*	12.5
Arts subject as required		12.5
Semester 2		
620-160	Experimental Design & Data Analysis *(p.5)*	12.5
451-101	Surveying 1 *(p.5)*	12.5
Arts subjects as required		25

* Students who studied Specialist Maths 3/4 in VCE, should take 620-141 Mathematics A instead of 620-161 Introductory Mathematics.

Second year		Points
Semester 1		
451-103	Information Science and Programming *(p.5)*	12.5
Arts subjects as required		37.5
Semester 2		
451-105	Introduction to GIS and Remote Sensing *(p.5)*	12.5
451-200	Surveying 2 *(p.6)*	12.5
620-140	Intermediate Mathematics *(p.4)*	12.5
Arts subjects as required		12.5

Third year		Points
Semester 1		
451-203	Land Law *(p.6)*	12.5
451-204	Professional Development *(p.6)*	12.5
451-208	Computational Methods in Geomatics *(p.6)*	12.5
Arts subject as required		12.5
Semester 2		
451-206	Least Squares & Network Analysis *(p.6)*	12.5
451-337	Satellite Positioning and Geodesy *(p.8)*	12.5
Arts subjects as required		25

Fourth year		Points
Semester 1		
451-333	Cadastral Surveying & Land Development *(p.7)*	12.5
451-332	Imaging in the Geosciences *(p.7)*	12.5
451-235	Spatial Databases *(p.7)*	12.5
Arts subjects as required		12.5
Semester 2		
451-236	Spatial Visualisation *(p.7)*	12.5
Choose one of:		
451-337	Satellite Positioning and Geodesy *(p.8)*	12.5
or		
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5
or		
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
or		
451-447	Photogrammetry *(p.9)*	12.5
Art subjects as required		25

Fifth year		Points
Year-long		
451-450	Research Project *(p.9)*	25
Semester 1		
451-418	Land Administration *(p.8)*	12.5
451-449	Professional and Business Studies *(p.9)*	12.5
Arts subject as required		12.5
Semester 2		
451-422	Residential Land Development *(p.8)*	12.5
Arts subjects as required		25

Bachelor of Laws/Bachelor of Geomatic Engineering (LLB/BGeomE)

Details of this course structure are available from the Department of Geomatics.

Bachelor of Geomatic Engineering/Bachelor of Science (BGeomE/BSc)

Students taking combined degree courses and who intend to overlap third- and later-year subjects, should consult with a course adviser to ensure all core geomatic engineering requirements are met. Students can elect any science major within the BSc program.

The recommended or standard course structures are listed below. When setting the timetable every effort will be made to avoid clashes between the times of classes associated with these sets of subjects. Students should be aware however, that if it proves to be impossible to achieve a timetable without clashes in these sets of subjects, the Faculty reserves the right to modify course structures in order to eliminate the conflicts. Students will be advised during the enrolment period of the semester if the recommended courses need to be varied. Where the courses include elective subjects these should be chosen so that timetable clashes are avoided. In particular, students in combined degrees should plan their courses so that the subjects chosen in the other faculty do not clash with those recommended for the engineering component.

First year		Points
Semester 1		
451-103	Information Science and Programming *(p.5)*	12.5
or		
433-171	Introduction to Programming *(p.17)*[1]	12.5
451-100	Geomatics Science *(p.5)*	12.5
451-113	Computer Systems and Graphics *(p.5)*	12.5
620-161	Introductory Mathematics *(p.6)**	12.5
Semester 2		
451-101	Surveying 1 *(p.5)*	12.5
451-105	Introduction to GIS and Remote Sensing *(p.5)*	12.5
620-140	Intermediate Mathematics *(p.4)**	12.5
620-160	Experimental Design & Data Analysis *(p.5)*	12.5

1. Students planning to undertake computer science as the science major in the combined degree must complete 433-171 Introduction to Programming and 433-172 Algorithmic Problem Solving or 433-151 Introduction to Programming (Advanced) & 433-152 Algorithmic Problem Solving (Advanced) for science points prior to commencing second-year computer science subjects.

* Students who studied Specialist Maths 3/4 in VCE, should take the sequence 620-141 Mathematics A and 620-142 Mathematics B instead of 620-161 Introductory Mathematics and 620-140 Intermediate Mathematics.

Second year		Points
Semester 1		
451-203	Land Law *(p.6)*	12.5
451-208	Computational Methods in Geomatics *(p.6)*	12.5
451-235	Spatial Databases *(p.7)*	12.5
Science subject as required		12.5
Semester 2		
451-200	Surveying 2 *(p.6)*	12.5
451-206	Least Squares & Network Analysis *(p.6)*	12.5
451-236	Spatial Visualisation *(p.7)*	12.5
Science subject as required		12.5

Third year		Points
Semester 1		
451-204	Professional Development *(p.6)*	12.5
451-331	Spatial Analysis *(p.7)*	12.5
451-332	Imaging in the Geosciences *(p.7)*	12.5
451-333	Cadastral Surveying & Land Development *(p.7)*	12.5
Semester 2		
451-337	Satellite Positioning and Geodesy *(p.8)*	12.5
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
Science subject as required		12.5

Fourth year		Points
Semester 1		
451-418	Land Administration *(p.8)*	12.5

Fourth year		Points
or		
451-499	Integrated Spatial Systems 2 *(p.9)*	12.5
325-101	Managing People and Organisations *(p.1)*	12.5
or		
421-258	Engineering Business Management *(p.10)*	12.5
Science subjects as required		25
Semester 2		
451-447	Photogrammetry *(p.9)*	12.5
Science subjects as required		37.5

Fifth year		Points
Year-long		
451-450	Research Project *(p.9)*	25
Semester 1		
451-449	Professional and Business Studies *(p.9)*	12.5
Science subjects as required		25
Semester 2		
451-422	Residential Land Development *(p.8)*	12.5
Science subjects as required		25

Bachelor of Geomatic Engineering/Bachelor of Science (BGeomE/BSc) (Env Sci)

First year		Points
Semester 1		
451-103	Information Science and Programming *(p.5)*	12.5
or		
433-171	Introduction to Programming *(p.17)*	12.5
451-100	Geomatics Science *(p.5)*	12.5
451-113	Computer Systems and Graphics *(p.5)*	12.5
620-161	Introductory Mathematics *(p.6)**	12.5
Semester 2		
451-101	Surveying 1 *(p.5)*	12.5
451-105	Introduction to GIS and Remote Sensing *(p.5)*	12.5
620-140	Intermediate Mathematics *(p.4)**	12.5
620-160	Experimental Design & Data Analysis *(p.5)*	12.5

* Students who studied Specialist Maths 3/4 in VCE, should take the sequence 620-141 Mathematics A and 620-142 Mathematics B instead of 620-161 Introductory Mathematics and 620-140 Intermediate Mathematics.

Second year		Points
Semester 1		
451-203	Land Law *(p.6)*	12.5
451-204	Professional Development *(p.6)*	12.5
451-208	Computational Methods in Geomatics *(p.6)*	12.5
610-141	Chemistry A *(p.2)*	12.5
Semester 2		
451-200	Surveying 2 *(p.6)*	12.5
451-206	Least Squares & Network Analysis *(p.6)*	12.5
451-236	Spatial Visualisation *(p.7)*	12.5
610-142	Chemistry B *(p.2)*	12.5

Third year		Points
Semester 1		
451-331	Spatial Analysis *(p.7)*	12.5
451-333	Cadastral Surveying & Land Development *(p.7)*	12.5
650-141	Biology of Cells and Organisms *(p.1)*	12.5
625-101	Earth Sciences - The Global Environment *(p.1)*	12.5
Semester 2		
451-337	Satellite Positioning and Geodesy *(p.8)*	12.5
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
650-142	Genetics & The Evolution of Life *(p.1)*	12.5

Fourth year		Points
Semester 1		
451-332	Imaging in the Geosciences *(p.7)*	12.5
451-418	Land Administration *(p.8)*	12.5
451-499	Integrated Spatial Systems 2 *(p.9)*	12.5
Science subject as required		12.5
Semester 2		
451-447	Photogrammetry *(p.9)*	12.5
610-280	Environmental Chemistry *(p.5)*	12.5
620-270	Applied Statistics *(p.8)*	12.5
Science subject as required		12.5

Fifth year		Points
Year-long		
451-450	Research Project *(p.9)*	25
Semester 1		
451-449	Professional and Business Studies *(p.9)*	12.5
600-303	Environmental Risk Assessment *(p.1)*	12.5
620-371	Linear Models *(p.11)*	12.5
Semester 2		
451-422	Residential Land Development *(p.8)*	12.5
600-301	Problem Solving in Environmental Science *(p.1)*	12.5
Science subject as required		12.5

Bachelor of Geomatic Engineering/Bachelor of Information Systems (BGeomE/BIS)

Students taking combined degree courses who intend to overlap third- and later-year subjects, should consult with a course adviser to ensure all core engineering requirements are met.

The recommended or standard course structures are listed below. When setting the timetable every effort will be made to avoid clashes between the times of classes associated with these sets of subjects. Students should be aware however, that if it proves to be impossible to achieve a timetable without clashes in these sets of subjects, the Faculty reserves the right to modify course structures in order to eliminate the conflicts. Students will be advised during the enrolment period of the semester if the recommended courses need to be varied. Where the courses include elective subjects these should be chosen so that timetable clashes are avoided. In particular, students in combined degrees should plan their courses so that the subjects chosen in the other faculty do not clash with those recommended for the engineering component.

First year		Points
Semester 1		
451-100	Geomatics Science *(p.5)*	12.5
451-113	Computer Systems and Graphics *(p.5)*	12.5
620-161	Introductory Mathematics *(p.6)**	12.5
Information systems subject as required		12.5
Semester 2		
451-101	Surveying 1 *(p.5)*	12.5
451-105	Introduction to GIS and Remote Sensing *(p.5)*	12.5
620-140	Intermediate Mathematics *(p.4)**	12.5
620-160	Experimental Design & Data Analysis *(p.5)*	12.5

* Students who studied Specialist Maths 3/4 in VCE, should take the sequence 620-141 Mathematics A and 620-142 Mathematics B instead of 620-161 Introductory Mathematics and 620-140 Intermediate Mathematics.

Second year		Points
Semester 1		
451-203	Land Law *(p.6)*	12.5
451-204	Professional Development *(p.6)*	12.5
451-208	Computational Methods in Geomatics *(p.6)*	12.5
Information systems subject as required		12.5
Semester 2		
451-200	Surveying 2 *(p.6)*	12.5
451-206	Least Squares & Network Analysis *(p.6)*	12.5
451-236	Spatial Visualisation *(p.7)*	12.5
Information systems subject as required		12.5

Third year		Points
Semester 1		
451-333	Cadastral Surveying & Land Development *(p.7)*	12.5
Choose one of:		
451-331	Spatial Analysis *(p.7)*	12.5
451-332	Imaging in the Geosciences *(p.7)*	12.5
Information systems subjects as required		25
Semester 2		
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
451-337	Satellite Positioning and Geodesy *(p.8)*	12.5
Information systems subjects as required		25

Fourth year		Points
Semester 1		
451-418	Land Administration *(p.8)*	12.5
451-449	Professional and Business Studies *(p.9)*	12.5
Information systems subjects as required		25
Semester 2		
Choose one of:		
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5
or		

Fourth year

		Points
451-447	Photogrammetry *(p.9)*	12.5
Information systems subjects as required		37.5

Fifth Year

		Points
Year-long		
451-450	Research Project *(p.9)*	25
Semester 1		
Information systems subjects as required		37.5
Semester 2		
451-422	Residential Land Development *(p.8)*	12.5
Information systems subjects as required		25

Bachelor of Geomatic Engineering/Bachelor of Planning and Design (Property and Construction) (BGeomE/BPD)

THERE WILL BE NO ENTRY INTO THIS COURSE FROM 2007.

The recommended or standard course structures are listed below. When setting the timetable every effort will be made to avoid clashes between the times of classes associated with these sets of subjects. Students should be aware however, that if it proves to be impossible to achieve a timetable without clashes in these sets of subjects, the Faculty reserves the right to modify course structures in order to eliminate the conflicts. Students will be advised during the enrolment period of the semester if the recommended courses need to be varied. Where the courses include elective subjects these should be chosen so that timetable clashes are avoided. In particular, students in combined degrees should plan their courses so that the subjects chosen in the other faculty do not clash with those recommended for the engineering component.

Second year

		Points
Semester 1		
316-102	Introductory Microeconomics *(p.1)*	12.5
451-103	Information Science and Programming *(p.5)*	12.5
702-237	Construction Technology 2A *(p.7)*	12.5
Choose one of:		
702-102	City in History *(p.5)*	12.5
705-173	Shaping the Metropolis *(p.18)*	12.5
702-117	Principles of Construction Management *(p.15)*	12.5
Semester 2		
451-105	Introduction to GIS and Remote Sensing *(p.5)*	12.5
451-200	Surveying 2 *(p.6)*	12.5
620-140	Intermediate Mathematics *(p.4)*	12.5
316-101	Introductory Macroeconomics *(p.1)*	12.5

Third year

		Points
Semester 1		
451-203	Land Law *(p.6)*	12.5
451-204	Professional Development *(p.6)*	12.5
451-208	Computational Methods in Geomatics *(p.6)*	12.5
702-213	Principles of Property Valuation *(p.15)*	12.5
Semester 2		
451-206	Least Squares & Network Analysis *(p.6)*	12.5
451-236	Spatial Visualisation *(p.7)*	12.5
702-219	Science and Services *(p.18)*	12.5
306-107	Accounting Reports and Analysis *(p.1)*	12.5

Fourth year

		Points
Semester 1		
451-235	Spatial Databases *(p.7)*	12.5
451-332	Imaging in the Geosciences *(p.7)*	12.5
451-333	Cadastral Surveying & Land Development *(p.7)*	12.5
705-315	Urban Economic Geography *(p.20)*	12.5
or		
702-216	Introduction to Cost Management *(p.11)*	12.5
Semester 2		
451-337	Satellite Positioning and Geodesy *(p.8)*	12.5
702-211	Income Property Analysis *(p.11)*	12.5
705-325	Planning the Productive City *(p.14)*	12.5
or		
702-361	Construction Cost Planning *(p.5)*	12.5
Choose one of:		
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
or		
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5
or		
451-447	Photogrammetry *(p.9)*	12.5

Fifth year

		Points
Year-long		
451-450	Research Project *(p.9)*	25
Semester 1		
451-418	Land Administration *(p.8)*	12.5
451-449	Professional and Business Studies *(p.9)*	12.5
702-353	Statutory Valuation *(p.19)*	12.5
Semester 2		
451-422	Residential Land Development *(p.8)*	12.5
702-355	Property Management *(p.16)*	12.5
702-309	Structures and Construction 3B *(p.19)*	12.5
or		
702-219	Science and Services *(p.18)*	12.5

Note 1: 700- prefix subjects may be substituted with alternative subjects with the approval of the Faculty of Architecture Building and Planning, and the Faculty of Engineering.

Note 2: Students wanting a quantity surveying background should complete 702-216, 702-416, 702-361, 702-309.

Diploma in Geographic Information Systems

Students undertaking the concurrent Diploma in Geographic Information Systems (DipGIS) can enrol in either a Geography stream or a Geomatics stream. Students are encouraged to consult with a course adviser in the Faculty of Arts, School of Anthropology, Geography and Environmental Sciences (SAGES), or a course adviser in the Faculty of Engineering, Department of Geomatics to determine which stream best complements their undergraduate degree studies.

Entry to the concurrent diploma will normally take place in first or second year of the undergraduate degree program.

Geography stream

		Points
Compulsory subjects		
451-113	Computer Systems and Graphics *(p.5)*	12.5
451-105	Introduction to GIS and Remote Sensing *(p.5)*	12.5
Elective subjects		
451-236	Spatial Visualisation *(p.7)*	12.5
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
121-503	Research Methods and Design *(p.7)*	12.5
620-160	Experimental Design & Data Analysis *(p.5)*	12.5
121-454	Computer-aided Policymaking *(p.7)*	12.5
136-205	Cybersociety *(p.4)*	12.5
121-227	Spatial Informatics and GIS *(p.5)*	12.5
451-236	Spatial Visualisation *(p.7)*	12.5
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5

Note: A maximum of one subject not included in these electives may be taken with approval from the course coordinator.

Geomatics stream

		Points
Compulsory subjects		
451-201	Geomatics for Engineers *(p.6)*	12.5
or		
451-100	Geomatics Science *(p.5)*	12.5
451-105	Introduction to GIS and Remote Sensing *(p.5)*	12.5
451-113	Computer Systems and Graphics *(p.5)*	12.5
Sub-total		*37.5*
Elective subjects		
At least one of the following:		
121-454	Computer-aided Policymaking *(p.7)*	12.5
136-205	Cybersociety *(p.4)*	12.5
At least three of the following:		
451-103	Information Science and Programming *(p.5)*	12.5
451-331	Spatial Analysis *(p.7)*	12.5
451-418	Land Administration *(p.8)*	12.5
451-340	Integrated Spatial Systems 1 *(p.8)*	12.5
451-499	Integrated Spatial Systems 2 *(p.9)*	12.5
451-236	Spatial Visualisation *(p.7)*	12.5
451-341	Applications of GIS and Remote Sensing *(p.8)*	12.5
Sub-total		*62.5*

Note: A maximum of one subject not included in these electives may be taken with approval from the course coordinator.

Note: The Diploma of GIS is not available for BGeomE and BGeoIT students since many of the same subjects are core requirements of the BGeomE, BGeoIT and the DipGIS. The purpose of the Diploma is to provide 100 points of Geomatics and Anthropology, Geography and Environmental Studies to students enrolled in other courses.

Subject descriptions

121-172 Global Ecology and Biogeography

See full subject details on page 2.

121-021 Environmental Politics and Management

See full subject details on page 3.

433-171 Introduction to Programming

See full subject details on page 17.

620-140 Intermediate Mathematics

See full subject details on page 4.

620-161 Introductory Mathematics

See full subject details on page 6.

451-100 Geomatics Science

Credit points: 12.5

Coordinator: Mr C Ogleby

Contact: Twenty-four hours of lectures and 24 hours of practical classes *(Semester 1).*

Description: Upon completion of this subject students should have an appreciation of the diverse variety of geomatics-related science and technology that can be applied to current geomatics engineering practices. Students should also have an understanding of the basic theory of plane surveying, including instrument calibration and presentation of technical information.

Topics covered include coordinate systems and maps; satellite navigation and positioning systems; land titles, land acquisition and subdivision; hydrographic surveying; geographic information systems; environmental visualisation; photogrammetry; and high precision industrial measurement. The unit also includes a transition program to facilitate the move from secondary school to university.

Assessment: One 2-hour written examination at the end of semester (35%) 6 fortnightly exercises (2 weighted at 7.5%, 2 weighted at 10%, and 2 weighted at 15%).

451-101 Surveying 1

Credit points: 12.5

Coordinator: Mr C Ogleby

Prerequisites: 451-100 Geomatics Science (prior to 2006 Geomatics Science 1A) or 451-201 Geomatics for Engineers

Contact: Twenty-four hours of lectures and 24 hours of practical classes plus attendance at a residential field course *(Semester 2).*

Description: Upon completion of this subject students should have an understanding of the data acquisition techniques of plane surveying, and practical experience with computer packages for spatial information reduction and plotting. The unit also includes a transition program of 10 hours.

This unit includes the use of basic surveying equipment such as theodolites, levels and total stations, as well as the techniques of linear distance measurement, levelling, traversing, tacheometry, and field-to-office surveying. It includes the reduction of measurement data, and the presentation of this information on plans and computer graphics systems. A residential field course, usually of five days duration, forms a component of this subject. The field course is typically held at Creswick in November and its aims are to consolidate practical skills and to gain experience in working as a team in a realistic workplace environment.

Assessment: One 2-hour written examination at the end of semester (35%) 6 fortnightly exercises (2 weighted at 7.5%, 2 weighted at 10%, and 2 weighted at 15%).

451-102 Introduction To Surveying (B.P.D.)

Credit points: 12.5

Coordinator: To be advised

Contact: Twenty-four hours of lectures and 24 hours of tutorial and practice classes *(Semester 2).*

Description: The objectives of this subject are:

1. to teach the basic surveying principles and skills commonly needed by those involved in the building design and construction industry; and

2. to demonstrate the role and application of modern surveying techniques and technologies.

Topics to be covered in lectures and practical sessions include the role and importance of surveying skills in the construction industry; levelling surveys and preparing contour plans; linear measurement; existing conditions surveys; setting out for new construction; GPS technology and applications; laser scanning; high-rise construction surveying; and GIS applications.

Assessment: A 3-hour written examination at the end of semester (50%), plus assignments and practical exercise reports totalling not more than 40 pages (40%) plus tests throughout the semester (10%). Students must achieve a grade of at least 50% in the examination in order to pass the subject.

451-103 Information Science and Programming

Credit points: 12.5

Coordinator: Dr Allison Kealy

Prerequisites: None

Contact: Four hours per week (2 hours lecture, 2 hours practical) *(Semester 1).*

Description: This subject provides an introduction to problem solving in Geomatics using spreadsheets and scientific programming. The focus will include:

- algorithmic problem solving;
- the structure and syntax of the procedural programming language Microsoft Visual Basic;
- the design and development of computer software packages;
- computational methods in Geomatics using Microsoft Excel spreadsheets; and
- using Microsoft Visual Basic within the Microsoft Excel environment.

In undertaking this subject, students should be able to:

- design and write scientific programs;
- solve practical problems in Geomatics through the development of simple Visual Basic programs;
- use Microsoft Excel to efficiently undertake routine computations in Geomatics; and
- write Microsoft Visual Basic routines for use in Excel in order to generate practical solutions for more complex Geomatics problems.

Assessment: One 3-hour written examination at the end of semester (50%) Two written programs (one set at the beginning of semester and due mid semester, the other set mid semester and due at the end of semester) and the relevant documentation to support the program. Each worth 25%, totalling 3000 words.

451-105 Introduction to GIS and Remote Sensing

Credit points: 12.5

Coordinator: Dr J Leach & Assoc Prof G Hunter

Contact: Twenty-four hours of lectures and 24 hours of practicals and tutorials *(Semester 2).*

Description: The objective of this subject is to introduce students to remote sensing and geographic information systems. By the end of the subject students should have an understanding of the acquisition of remotely sensed imagery and be familiar with the basic principles and procedures of digital image processing. They should have developed practical skills in the interpretation and use of remotely sensed data. They should also have an introductory knowledge of the range of GIS applications; understand the fundamental role of GIS in decision making; be familiar with the basic principles and procedures associated with GIS; and have developed basic practical skills in the use of GIS software.

Assessment: One 3-hour written examination at the end of semester (50%) Two written programs (one set at the beginning of semester and due mid semester, the other set mid semester and due at the end of semester) and the relevant documentation to support the program. Each worth 25%, totalling 3000 words.

451-113 Computer Systems and Graphics

Credit points: 12.5

Coordinator: Mr C Ogleby

Contact: Twenty-four hours of lectures and 24 hours of laboratory sessions *(Semester 1).*

Description: The objective of this subject is to provide students with a clear understanding of a range of computer hardware, operating systems and network software applicable to later coursework and professional activities.

Topics covered include introduction to basic computer hardware components and configurations; an introduction to the Windows and Unix operating systems; presentation managers, window systems and graphical user interfaces; computer networks and internet applications; worldwide web authoring and web page design; aspects of physical and cognitive ergonomics; multimedia and virtual reality; and CAD software with particular emphasis on geomatics applications.

Assessment: An online test completed at the end of semester (20%) web-based portfolio of 6 assignments (each worth 10%). Final submission of web-based portfolio at the end of semester (20%).

451-200 Surveying 2

Credit points: 12.5

Coordinator: Dr A Kealy

Prerequisites: 451-100 Geomatics Science (prior to 2006 Geomatics Science 1A), 451-101 Surveying 1 (prior to 2006 Geomatics Science 1B), 620-161 Introductory Mathematics and 620-140 Intermediate Mathematics, or 620-141 Mathematics A

Contact: Twenty-four hours of lectures and 24 hours of tutorials and laboratory sessions *(Semester 2).*

Description: This subject provides the concepts, theory and applications of high precision measurement techniques used in land surveying. The focus will be on six core areas.

1. Introduction to survey standards and specifications.

2. Introduction to survey network design and adjustment.

3. Operational and quality control aspects of electronic distance measurement (EDM), angle measurements, trigonometric heighting and precise levelling.

4. Introduction to satellite positioning, observation techniques and data processing.

5. Introduction to geodetic datums, coordinate systems, map projections, transformations and conversions.

6. Introduction to advanced positioning techniques including; automated field surveying and laser scanning.

In undertaking this course, students should be able to:

- use recommended standard and specifications to describe survey measurements and results
- design survey networks consistent with the precision and accuracy requirements of a specific task
- undertake data acquisition techniques and computations to obtain co-ordinates from GPS receivers
- define the error sources in EDMs, total stations and precise levels and discuss techniques for their minimisation
- understand the relationships between coordinate systems, datums and map projections and use appropriate software to convert and transform data
- discuss the trends and operational characteristics of modern survey instrumentation

Assessment: One 3-hour written examination at the end of semester (50%), a 3000-word assignment set at the beginning of semester and due at the end of semester, comprising a major field practice exercise and report (50%).

451-201 Geomatics for Engineers

Credit points: 12.5

Coordinator: Mr C Ogleby

Contact: Twenty-four hours of lectures and 24 hours of practical classes *(Semester 1).*

Description: The objective of this subject is to develop an appreciation of the diverse variety of geomatics-related science and technology as applied to current engineering practices.

Topics covered include coordinate systems and maps; satellite navigation and positioning systems; land titles, land acquisition and subdivision; hydrographic surveying; geographic information systems; environmental visualisation; photogrammetry; and high precision industrial measurement.

Assessment: One 2-hour written examination at the end of semester (35%) 6 fortnightly exercises (2 weighted at 7.5%, 2 weighted at 10%, and 2 weighted at 15%).

451-203 Land Law

Credit points: 12.5

Coordinator: Assoc Prof G Hunter

Contact: Forty-eight hours of lectures and practical exercises *(Semester 1).*

Description: This subject gives students a basic understanding of the history and operation of urban planning in Victoria; the origin and background of the land laws affecting our community; and the statute laws that affect surveying practice in Victoria.

Topics include the economic and social significance of land and buildings; urban planning and its role in the process of urban development; the concept, substance and practice of development regulation, land use zoning and comprehensive planned development; planning schemes and the Planning and Environment Act; law of property in land; reception of English law into Australia; real and personal property; land tenure and its history; estates in land; interests of other persons; qualifications of the rights of ownership; land as a security; mortgages; transfer of land; the common law and the Transfer of Land Act; the extinction of interests in land; adverse possession; legal persons, corporations and partnerships; law relating to surveying; history of Victorian surveying law; introduction to current survey law; *Surveying Act 2004* and regulations; *Survey Coordination Act 1958* and regulations; and introduction to relevant provisions of the *Land Act 1958*, *Property Law Act 1958* and the *Fences Act 1968*.

Assessment: One 3-hour written examination at the end of semester (70%), three written assignments 500 words each in length (10% each) due at monthly intervals during the semester.

451-204 Professional Development

Credit points: 12.5

Coordinator: Dr J Leach

Contact: Twenty-four hours of lectures and 24 hours of tutorials *(Semester 1).*

Description: The objectives of this subject are to develop skills for effective written and verbal presentations, team building, and to improve interview and meeting skills.

The content comprises requirements of effective writing including structure, style, vocabulary, citations and references; requirements and purposes of technical reports; literature searches; editing a report; use of graphics in reports; preparation of reports specifically for tribunals, government committees, contract proposals, appeals, environmental impact statements; preparation of a curriculum vitae; verbal presentations; study of personality types, group dynamics and team building; use of audio-visual equipment; conduct of meetings and rules of business; and interviewing techniques.

Assessment: A school visit to be completed any time during the semester (15%). A curriculum vitae to be completed in week 5 (15%). A 10-minute oral presentation to be given at the end of semester (20%). A 3000 report with images, maps and tables due at the end of semester (25%). An A2 team poster (imaging/presentation/graphics) due at the end of semester (25%).

451-206 Least Squares & Network Analysis

Credit points: 12.5

Coordinator: Dr P Collier

Prerequisites: 451-208 Computational Methods in Geomatics

Contact: Twenty-four hours of lectures and 24 hours of tutorials *(Semester 2).*

Description: Upon completion of this subject, students should have a basic understanding of the theory of least squares estimation and should be able to confidently apply this knoweldge to the solution of simple adjustment and estimation problems in the spatial sciences. Furthermore, this subject will provide an introduction to the design, adjustment and analysis of survey networks by application of least squares techniques.

Content of subject includes:

- review of error theory
- propagation of variances
- testing for measurement outliers
- review of matrix operations
- understanding variance matrices
- observation equations
- linearisation of non-linear functions
- the least squares algorithm
- testing least squares adjustments
- interpreting results
- network adjustment in theory and practice

Assessment: One 3-hour written examination at the end of semester (50%). Ten weekly written assignments, each worth 4%. One 1-hour class test in week 8 (10%). Students must achieve a grade of at least 50% in the examination in order to pass this subject.

451-208 Computational Methods in Geomatics

Credit points: 12.5

Coordinator: Assoc Prof F Leahy

Prerequisites: 620-161 Introductory Mathematics and 620-140 Intermediate Mathematics or 620-141 Mathematics A.

Contact: Twenty-four hours of lectures and 24 hours of tutorials *(Semester 1).*

Description: The objective of this subject is to apply theories gained in earlier mathematical studies to fundamental problems associated with practice in geomatics.

Topics covered include spherical trigonometry including properties of spherical triangles, development of fundamental formulae relating elements, area and spherical excess, application in navigation, map projections and positional astronomy; vector geometry for geomatics including vector representation of spatial relationships between points, line and planes, applications in positioning, mining surveying, solid modelling, reference frames and spatial analysis representations of curves on the ellipsoid as vector chains; geometry of the ellipsoid, the ellipsoid as a geodetic reference surface, coordinate systems, geocentric cartesian, curvilinear and universal transverse mercator (UTM), plane curves, loxodromes and geodesics computations on the UTM map grid; transformations between reference frames, rotation matrices for moving vectors between reference frames, properties of orthogonal matrices, conformal transformations in two and three dimensions; and algorithms for solving simultaneous linear equations, algorithms for general and symmetric matrix inversion, conditioning matrices for inversion, solutions for redundant linear equations, solutions for non-linear simultaneous equations, applications to curve fitting by least-squares methods.

Assessment: One 3-hour written examination at the end of semester (60%). 10-weekly 3-page assignments (4% each).

451-235 Spatial Databases

Credit points: 12.5

Coordinator: Dr Matt Duckham

Prerequisites: 451-103 Information Science and Programming or equivalent subject.

Contact: 2 hours lecture, 2 hours practical per week *(Semester 1).*

Description: The topics covered in this subject will include:

- fundamentals of spatial databases;
- spatial data modeling, including entity-relationship and object-oriented data models;
- indexes and access methods, including B-trees, quadtrees, and R-trees; and
- query languages and query processing.

In undertaking this subject, students should acquire the following specific skills:

- ability to develop database designs for a spatial applications;
- ability to query spatial and non-spatial database systems; and
- ability to use and customise specific spatial and non-spatial database systems.

Assessment: A 3-hour written examination at the end of semester (60% of marks) and the equivalent of 3000 words of coursework assessment comprising three separate practical assignments (40% of subject marks).

451-236 Spatial Visualisation

Credit points: 12.5

Coordinator: Prof Ian Bishop

Prerequisites: 451-105 Introduction to GIS and Remote Sensing or an equivalent subject.

Contact: 2 hours lecture, 2 hours practical per week *(Semester 2).*

Description: The subject introduces the theory and application of both abstract and realistic visualisation options in two, three and four dimensions. Specific topics include colour theory, communication theory; cartography; map animation; hypermapping, environmental visualisation, and augmented reality. Also included are technical aspects of computer graphics including image manipulation, three-dimensional modelling and transformations, perspective, hidden surface algorithms, illumination models, texture mapping, ray tracing and animation. Applications of scientific and environmental visualisation for planning and management in built and natural environments are reviewed.

Assessment: One 3-hour written examination at the end of semester (50%) Approximately 5 assignments, 2 weeks apart 600 words each. (50%).

451-312 GIS & Remote Sensing for Enviro Science

Credit points: 12.5

Coordinator: Dr J Leach & Assoc Prof G Hunter

Contact: Twenty-four hours of lectures and 24 hours of tutorials and practicals *(Semester 2).*

Description: The objective of this subject is to develop basic skills in digital data processing and interpretation, and geographic information systems.

Remote sensing component content includes principles of remote sensing; electromagnetic radiation; human vision; spaceborne and airborne sensors; and introduction to digital image processing including stretching, digital filters, arithmetic manipulations, image classification, rectification and geocoding.

Geographic information systems component content includes introduction to the information society and information management; definition of GIS; the range of GIS applications; the use of GIS for decision making; integration of GIS with other technologies; geographic referencing methods; geographic data structures and models; relationships between geographic features; database definition and modelling; and introduction to the technology associated with GIS.

Assessment: One 3-hour written examination at the end of semester (60%). Remote Sensing component - four 500-word practical assignments, each worth 5% GIS component - five 500-word practical assignments, each worth 4%.

451-331 Spatial Analysis

Credit points: 12.5

Coordinator: Dr S Winter

Prerequisites: 451-105 Introduction to GIS and Remote Sensing and 451-235 Spatial Databases (or equivalent subjects).

Contact: Two hours lecture, 2 hours practical per week *(Semester 1).*

Description: Content includes raster analysis by map algebra; point patterns; measures of dispersion; measures of arrangements; patterns of lines; paths, branching, topology and concepts of distance; patterns of area; patterns in fields; the role of spatial scale and spatial aggregation problems; exploratory spatial data analysis; and spatial autocorrelation.

Assessment: One 3-hour written examination at the end of semester (60%). Ten weekly assignments with practical exercise reports of about 4 pages length. The first assignment is optional and not marked. Some of the other assignments may be grouped to fortnightly assignments with report lengths equivalent to two weekly assignments. In any case the nine marked exercises are equally weighted to a total of 40%.

451-332 Imaging in the Geosciences

Credit points: 12.5

Coordinator: Prof C Fraser & Dr J Leach

Prerequisites: 620-161 Introductory Mathematics.

Contact: Twenty-four hours of lectures and 24 hours of tutorial and practice classes *(Semester 1).*

Description: Upon completion of this subject students should have an understanding of the techniques and applications of imaging systems in the geosciences, geomatics, and planetary and natural sciences, and an introductory knowledge of photogrammetry.

Content includes imaging requirements for topographic mapping, meteorology, planetary mapping, remote sensing, oceanography and the earth sciences; digital imaging systems; data visualisation; applications and case studies; geometry of a metric image, sensor interior orientation, perspective distortion and imaging scale; introduction to rectification and orthorectification; and the concept of parallax, stereo restitution, digital mapping, project planning and film scanners.

Assessment: One 3-hour written examination at the end of semester (60%), image interpretation component - practical assessment comprising 2 exercises due at the end of week 2 and at the end of the component (5% and 15%), image measurement component - practical assessment comprising 3 exercises (20%).

451-333 Cadastral Surveying & Land Development

Credit points: 12.5

Coordinator: Assoc Prof G Hunter

Prerequisites: 451-203 Land Law (prior to 2006 Planning, Property and Surveying Law).

Contact: Forty-eight hours of lectures and exercises *(Semester 1).*

Description: Upon completion of this subject students should have developed a sound knowledge of the legal and technical requirements for making a cadastral survey in Victoria; the preparation of the corresponding documentation in the form of plans and reports; and the legal and administrative procedures associated with land development in Victoria.

Content includes cadastral surveying; legal obligations and requirements imposed upon cadastral surveyors; history of land settlement in Victoria with respect to surveying; detailed examination of the land tenure systems in Victoria; boundaries, occupation and survey marks; methods of performing cadastral surveys and re-establishing title in urban and rural areas; cadastral survey computations and associated documentation; searching survey and title information; land development; dealings in land; adverse possession, bringing land under the *Transfer of Land Act*, amendment of title, easements, past practices (stratum/strata/cluster titles), Surveyor-General consents applications; land acquisition and compensation procedures; land subdivision; *Subdivision Act 1988* and associated regulations; planning and development controls and procedures; local government practices and documentation; roads: creation; widening; closure; sale; mining tenure in Victoria: survey requirements; extraction industry leases; and law relating to riparian and water rights.

Assessment: One 3-hour written examination at the end of semester (60%) Two 500 word practical assignments (15% each) and a 1000 word written assignment (10%). The 3 assignments are due at monthly intervals during the semester.

451-337 Satellite Positioning and Geodesy

Credit points: 12.5

Coordinator: Dr P Collier

Prerequisites: 451-200 Surveying 2 (prior to 2006 Geomatics Science 2), 451-208 Computational Methods in Geomatics and 451-206 Least Squares and Network Analysis.

Contact: Twenty-four hours of lectures and 36 hours of tutorial and practical classes *(Semester 2).*

Description: Upon completion of this subject students should have a basic understanding of the theory and applications of modern satellite geodesy. Space-based positioning systems (such as GPS) are used in conjunction with sophisticated mathematical modelling to solve the problems of determining 3-D position on and near the surface of the earth. The course will provide an overview of the theory and applications of satellite positioning, particularly in a geodetic context.

Content of the subject includes geodetic datum definition and coordinate systems, the principles and theory of satellite positioning, error modelling, practical applications and considerations, data processing strategies, heights from GPS and geoid modelling and the future of satellite geodesy.

Assessment: One 3-hour written examination at the end of semester (50%) Five fortnightly written assignments, each worth 8%. One 1-hour class test in week 8 (10%). Students must achieve a grade of at least 50% in the examination in order to pass the subject.

451-340 Integrated Spatial Systems 1

Credit points: 12.5

Coordinator: Dr Allison Kealy

Prerequisites: 451-200 Surveying 2, 451-235 Spatial Databases, 451-236 Spatial Visualization, 451-331 Spatial Analysis, or equivalent subjects.

Contact: 48 hours of lectures, tutorials and practical exercise *(Semester 2).*

Description: This subject provides fundamental concepts, theory, and applications of integrating spatial technologies with enabling technologies, such as wireless communications and the internet. The subject covers three core areas:

- studies in positioning technologies and measurement integration
- distributed GIS, web mapping, interoperability
- location-based services

Assessment: Three hours of written examination (50% of subject marks), and the equivalent of 3000 words of coursework assessment across the semester. The coursework assessment will comprise three separate practical exercises each of which is to be completed over a three-week period (10% each, 30% of subject marks), and a semester long investigative research assignment (20% of subject marks) due in Week 12.

451-341 Applications of GIS and Remote Sensing

Credit points: 12.5

Coordinator: Dr Joe Leach

Prerequisites: 451-105 Introduction to GIS and Remote Sensing, 451-235 Spatial Databases, 451-236 Spatial Visualisation, 451-331 Spatial Analysis, 451-332 Imaging in the Geosciences, or equivalent subjects

Contact: 2-hour lecture, 2 hours practical per week *(Semester 2).*

Description: Topics include:

- an overview of application areas in mapping; GIS application design and implementation; economical, managerial and institutional issues of GIS applications; GIS project feasibility studies, and GIS project realization;
- applications of remote sensing in resource mapping and monitoring, in the geosciences and in engineering as well as military and social planning applications. This will include a consideration of the image processing techniques used in each application, the capabilities of current sensor systems, the difficulties of operational implementation and the future potential in each application area.

Assessment: One 3-hour written examination at the end of semester (50%). Written assignments and reports on practical work over the semester: a 'major project' over the first six weeks with individual deliverables each week (4.2% each, equivalent of 500 words each) and four written reports on practical exercises due in the last six weeks on a weekly basis worth 6.2% each, and equivalent of 1000 words.

451-418 Land Administration

Credit points: 12.5

Coordinator: Prof I Williamson

Contact: Forty-eight hours of lectures, tutorials and practical exercises *(Semester 1).*

Description: Upon completion of this subject students should: have an understanding of the need for effective and efficient land administration systems and spatial data infrastructures (SDIs); be able to review a variety of technologies for designing and managing these systems; be able to understand and analyse a range of local and overseas approaches to land administration and SDIs in both developed and developing country contexts for sustainable development.

Topics covered include the concept of land and peoples relationship to land; evolution of cadastres and land administration systems, land administration projects as a development strategy for economic growth and poverty reduction; the cadastral concept and legal, fiscal, multi-purpose and marine cadastres; cadastral surveying and mapping - boundary options and technical options; principles and concepts of land registration; rights, restrictions and responsibilities related to land in the context of informal, formal and customary tenures; cadastral systems in developing countries including informal cadastres, parallel cadastres, marine cadastres and customary tenures; relevant international declarations and statements concerned with land administration; cadastral reform; land administration 'tool box'; institutional arrangements supporting land administration; spatial data infrastructures - principles, issues and case studies; digital cadastral data bases; modelling, designing and evaluating cadastral and land administration systems; land markets and their relationship to planning, valuation and cadastre; access to land information; land administration and spatial information systems in Victoria and associated government policy; the role of licensed cadastral surveyors.

Assessment: One 3-hour written examination at the end of semester (40%). A 4000-word major project report (20%). One 30-minute oral group presentation of the major report (20%). Tutorial assignments and participation (20%).

451-420 Spatial Data Handling (Hons)

Note: This subject is not offered in 2007

Credit points: 12.5

Prerequisites: 451-335 Application and Development of Geographic Information Systems, or equivalent.

Semester: Not Offered

Description: On completion of this subject, students should have: a sound knowledge of the fundamental techniques used in spatial data handling; and a firm understanding of the respective merits and limitations associated with using those methods.

Content: Coordinate geometry: coordinate systems, intersections of lines and planes, calculation of length and area. Coordinate adjustment: transformations, rubber sheeting. Feature editing: feature alignment generalisation, densification. Raster/vector conversion: raster to vector conversion, vector to raster conversion. Boolean functions: point, line and polygon overlay, buffer generation. Surface analysis: gradient, aspect, curvature, points of inflection, viewsheds, intervisibility, contouring, TIN formation.

451-422 Residential Land Development

Credit points: 12.5

Coordinator: Assoc Prof G Hunter

Prerequisites: 451-333 Cadastral Surveying and Land Development.

Contact: Forty-eight hours of lectures, tutorials and practical exercises *(Semester 2).*

Description: Upon completion of this subject students should have developed practical skills and knowledge in designing residential subdivisions and preparing the corresponding documentation.

Topics include the land development process, residential subdivision design requirements in Victoria, the subdivision design process, energy efficient subdivisions, planning legislation and environmental controls; the preparation of plans of subdivision and associated documentation; and the use of computer-aided design and drafting techniques.

Assessment: A practical assignment with 3 components worth 20%, 50% and 30% respectively due at monthly intervals during the semester.

451-424 Management of GIS(Hons)

Note: This subject is not offered in 2007.

Credit points: 12.5

Prerequisites: 451-335 Application and Development of Geographic Information Systems, or equivalent

Semester: Not Offered

Description: On completion of this subject, students should have a sound understanding of the diversity of GIS applications and their different requirements; a detailed knowledge of the system design and development process; an understanding of the major institutional and management issues affecting GIS; and strong practical skills in the use of current GIS technology.

Content: Introduction to typical application areas such as cadastral records and land information; facilities management; urban planning; land use and agriculture; nature resource management; environmental monitoring; marketing and demographic studies; defence and emergency service needs; decision making with GIS and decision support systems; knowledge-based techniques. System planning and implementation: gaining management support; determining system requirements; evaluation of alternative systems and benchmarking; pilot projects; cost/benefit analyses; system implementation and acquisition planning; the operational system. Management issues: data accuracy and quality; data ownership and custodianship; data access and liability; the economic value of data/pricing policies; GIS standards; the political nature of GIS; the future of GIS.

451-440 Research Methods

Note: This subject is not offered in 2007.

Credit points: 12.5

Coordinator: Dr Joe Leach

Contact: Lectures, seminars, guided study and research equivalent to 4 hours per week *(Not Offered).*

Description: Upon completion of this subject students will have the necessary skills to undertake their major honours research project. Through lectures and practical assignments students will explore traditional scientific methodology and processes leading to the development of a proposal to undertake research activity. Specifically, students will investigate different research paradigms, techniques for hypothesis formation and literature review, identify relevant geospatial statistical measures as they apply to research problems, research hypothesis testing and validation. In addition to these, students will explore project management methodologies; intellectual property, copyright, privacy and ethical issues for research; communication and presentation formats; and scientific writing in the form of abstracts, proposals, theses and journal papers.

451-447 Photogrammetry

Credit points: 12.5

Coordinator: Prof C Fraser

Prerequisites: 451-332 Imaging in the Geosciences and 451-206 Least Squares Estimation and Network Analysis.

Contact: Twenty-four hours of lectures and 24 hours of tutorials and practical exercises *(Semester 2).*

Description: Upon completion of this subject students should have a thorough understanding of the principles of modern photogrammetry, both topographic and non-topographic.

Topics cover the mathematical foundations of multi-image photogrammetry; bundle adjustment and sensor self-calibration; feature extraction and image matching; digital photogrammetric workstations; orthorectification, automated restitution and DTM extraction in aerial photogrammetry; GPS aerial triangulation; mathematical models, imaging characteristics and mapping products from high-resolution satellite imagery; close-range digital photogrammetry; and industrial and engineering applications of vision metrology.

Assessment: One 2-hour written examination at the end of semester (50%). One 1 hour mid-term test (20%). Six 4 page bi-weekly assignments (30%).

451-449 Professional and Business Studies

Credit points: 12.5

Coordinator: Prof I Williamson

Contact: Forty-eight hours of lectures, tutorials and practical exercises *(Semester 1).*

Description: Upon completion of this subject students should have an understanding of the role of a geomatics engineering professional within society. This subject will comprise two components.

Part A: Part A covers the functions and responsibilities of the professional engineer and professional surveyor within society. This involves a series of lectures on: professional ethics, the role of the public, private and academic sectors within engineering, and particularly within geomatics, professional organisations within surveying and geomatics disciplines at national regional and global scales and career development and resume writing.

Part B: This part covers business management, with a focus on surveying and geomatics-related businesses. This includes the particular areas of: setting up a business, time and resource management, financial management, leadership, success and goal setting, strategic planning, marketing, network techniques for planning, quality management and occupational health and safety. This should enable students to gain a good understanding of what is involved in setting up and running a business, as well as managing resources including time and people, at any level within a company.

Assessment: Part A: One joint written assignment of no more than 4000 words (25%). One joint oral presentation equivalent to 2000 words (10%). Five individual written class summaries of no more than one page (1% each - 5%). Individual written summary of oral presentations (2.5%).

Part B: One joint written assignment of no more than 4000 words (25%). One joint oral presentation equivalent to 2000 words (10%). Two individual written assignments of no more than 1000 words each (7.5% each - 15%). Five individual written class summaries of no more than one page (1% each - 5%). Individual written summary of the oral presentations (2.5%).

451-450 Research Project

Credit points: 25

Coordinator: Prof Ian Bishop

Contact: Guided study and research equivalent to four hours per week *(Year long).*

Description: Upon completion of this subject students should have developed skills in research, communication and writing by either individual or group investigation of a research topic and the subsequent preparation of a report; received experience in working independently or in groups on a project; and developed skills in planning, executing and managing a project.

The subject will include supervised individual or group discussions, individual or group investigation and experimental work, project management, and preparation and presentation of a final project report. This subject is considered the culmination of the educational experience within the undergraduate degree program in the Department of Geomatics. The project is designed to consolidate a range of skills which are considered essential in the development of a successful professional.

Assessment: Four short literature reviews (250 words each and 10% total), a literature synthesis (1000 words 7%), peer review of draft proposals (800 words 8%) and a full research proposal (2000 words - 15%) are completed in the first semester. A poster (10%) and paper (6000 words - 50%) are required at the end of second semester.

451-455 Research Project

Note: This subject is not offered in 2007.

Special requirements: A candidate wishing to pursue this course must have completed at least the third year of the course for the Degree of Bachelor of Geographic Information Technology, be deemed to be capable of advanced studies, and be recommended by the Head of Department.

Credit points: 62.5

Coordinator: Dr Joe Leach

Semester: Not Offered

Description: This is a program of research training carried out over a period of one year in any area of investigation relevant to geographic information technology. The objective for this unit is to facilitate the advanced development of academic and research skills necessary for career development in research or academia.

451-499 Integrated Spatial Systems 2

Credit points: 12.5

Coordinator: Dr Matt Duckham

Prerequisites: 451-340 Integrated Spatial Systems 1, 451-337 Satellite Positioning and Geodesy, or equivalent subjects.

Contact: 48 hours of lectures, tutorials and practical exercise *(Semester 1).*

Description: This subject provides advanced concepts, theory, and applications of integrating spatial technologies with enabling technologies, such as wireless communications and the internet. The subject covers three core areas:

- advanced studies in positioning technologies and measurement integration
- distributed GIS, web mapping, interoperability
- location-based services.

Assessment: Part A: One joint written assignment of no more than 4000 words (25%). One joint oral presentation equivalent to 2000 words (10%). Five individual written class summaries of no more than one page (1% each - 5%). Individual written summary of the oral presentations (2.5%). Part B: One joint written assignment of no more than 4000 words (25%). One joint oral presentation equivalent to 2000 words (10%). Two individual written assignments of no more than 1000 words each (7.5% each - 15%). Five individual written class summaries of no more than one page (1% each - 5%). Individual written summary of the oral presentations (2.5%).

620-141 Mathematics A

See full subject details on page 5.

620-142 Mathematics B

See full subject details on page 5.

620-160 Experimental Design & Data Analysis

See full subject details on page 5.

625-101 Earth Sciences - The Global Environment

See full subject details on page 1.

702-102 City in History

See full subject details on page 5.

702-115 Introduction to Property

See full subject details on page 11.

702-117 Principles of Construction Management

See full subject details on page 15.

702-137 Construction Technology 1A

See full subject details on page 6.

702-138 Construction Technology 1B

See full subject details on page 7.

702-211 Income Property Analysis

See full subject details on page 11.

702-216 Introduction to Cost Management

See full subject details on page 11.

702-219 Science and Services

See full subject details on page 18.

702-237 Construction Technology 2A

See full subject details on page 7.

702-238 Structural Systems

See full subject details on page 19.

705-173 Shaping the Metropolis

See full subject details on page 18.

705-219 Planning and Development Management

See full subject details on page 14.